



8. ULUSLARARASI TALAŞLI İMALAT SEMPOZYUMU

2 - 4 KASIM 2017

Barut Hotel Lara - Antalya

AISI 304 L Östenitik Paslanmaz Çelik Boruların Manyetik Aşındırıcılarla İşleme Yöntemiyle İşlenebilirliği

Ulaş Çaydaş-Mahmut Çelik

Fırat Üniversitesi Teknoloji Fakültesi Makine Mühendisliği Bölümü



Sunum İçeriği

- Çalışmanın Amacı
- Abrasif İşleme Yöntemleri
- Manyetik Aşındırıcılarla İşleme Yöntemi
- Deneysel Çalışmalar
- Deneysel Sonuçlar ve Tartışma
- Teşekkür



Çalışmanın Amacı

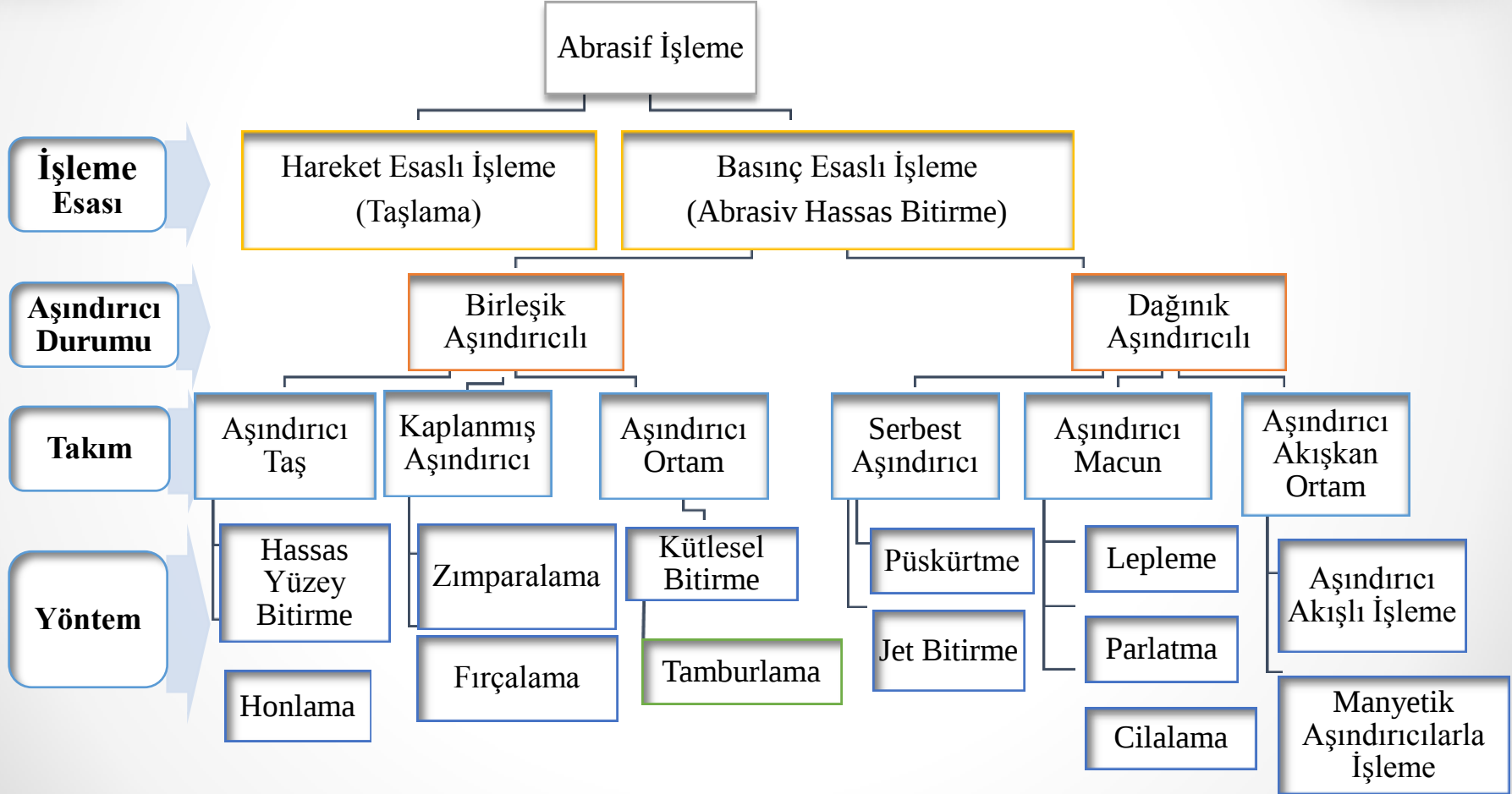
Gelişen teknoloji ile birlikte;

- Havacılık-Uzay
- Otomotiv
- Medikal vb.

Endüstrilerde yüksek hassasiyette üretilmiş parçalara ihtiyaç duyulmaktadır.



Abrasif İşleme Yöntemleri

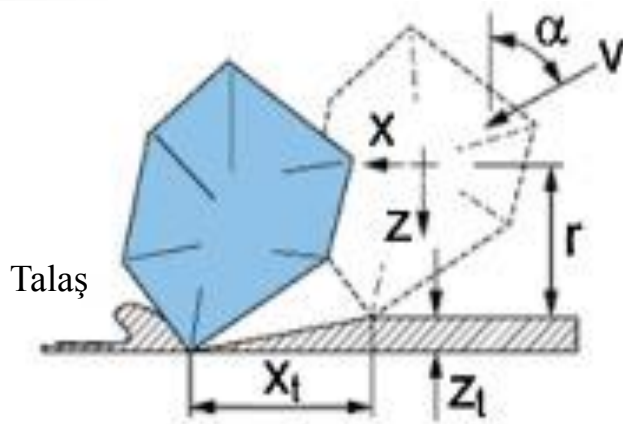




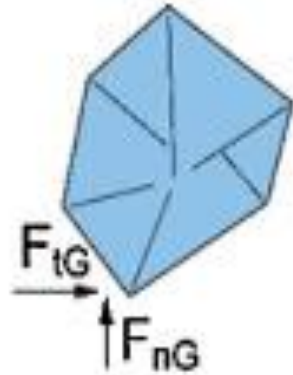
Abrasiv İşleme Yöntemleri



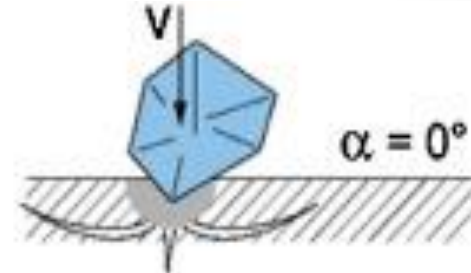
Talaş Kaldırma Mekanizması



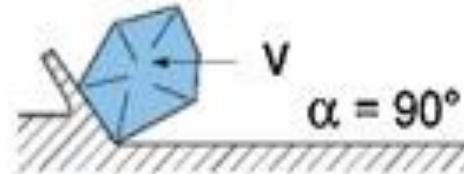
a) İş parçası üzerindeki tanecik



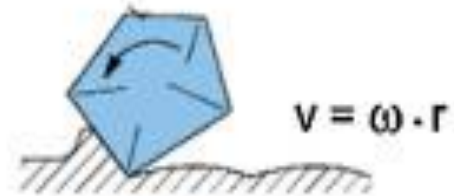
b) Aşındırıcı taneciğe etkiyen kuvvetler



c) Çatlak oluşumu



d) Kesme



e) Yuvarlanma



Manyetik Aşındırıcılarla İşleme Yöntemi



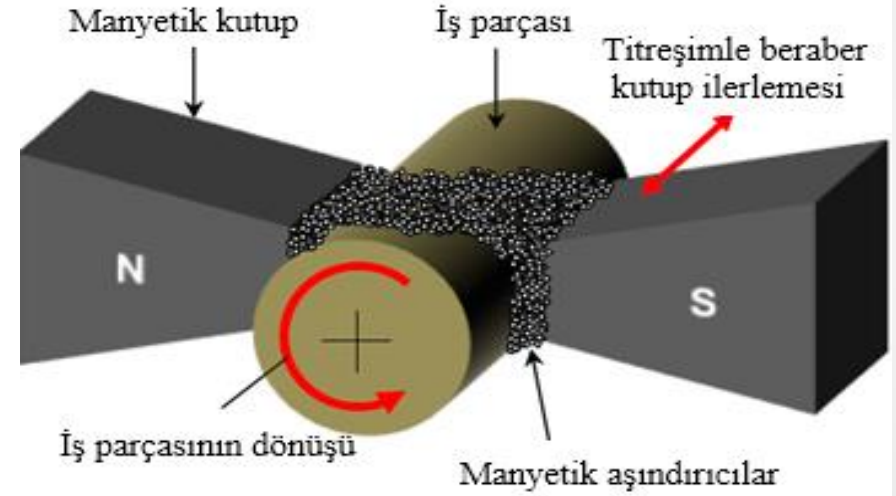
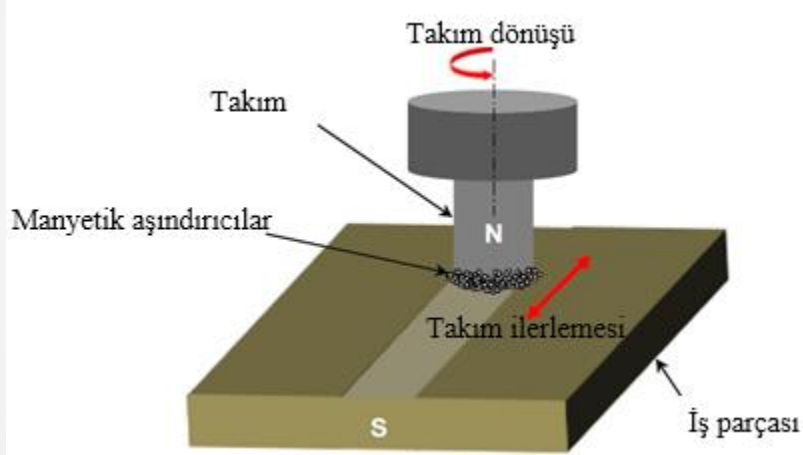
Demir esaslı manyetik tozlar

- Elmas,
- Silisyum karbür,
- Alüminyum oksit,
- Kübik bor nitrür

gibi aşındırıcılardan oluşan bir karışım kullanılmaktadır



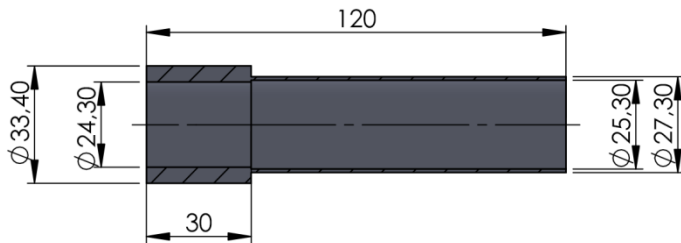
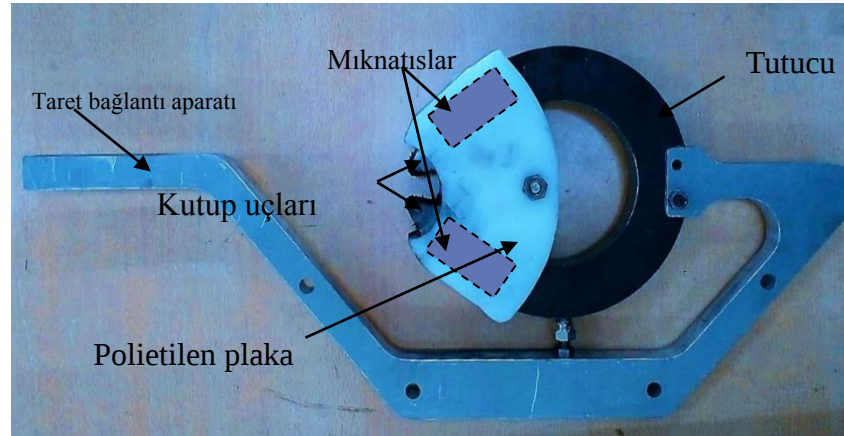
Manyetik Aşındırıcılarla İşleme Yöntemi





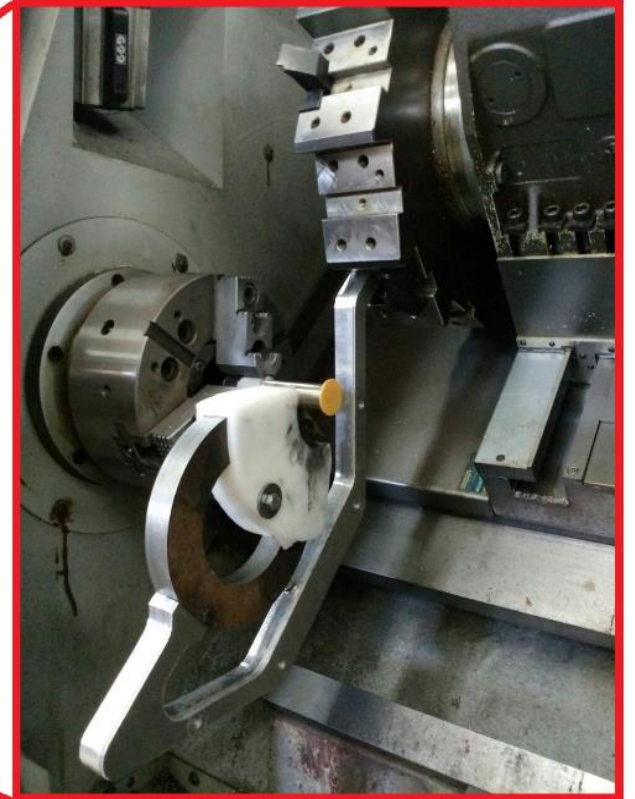
Deneyisel Çalışmalar

Kalite	C	Mn	P	S	Si	Cr	Ni
304L (1.4307)	%0,03 max	%2.0 max	%0.045 max	%0,03 max	%0,75 max	%18-20	%8-10





Deneyisel Çalışmalar



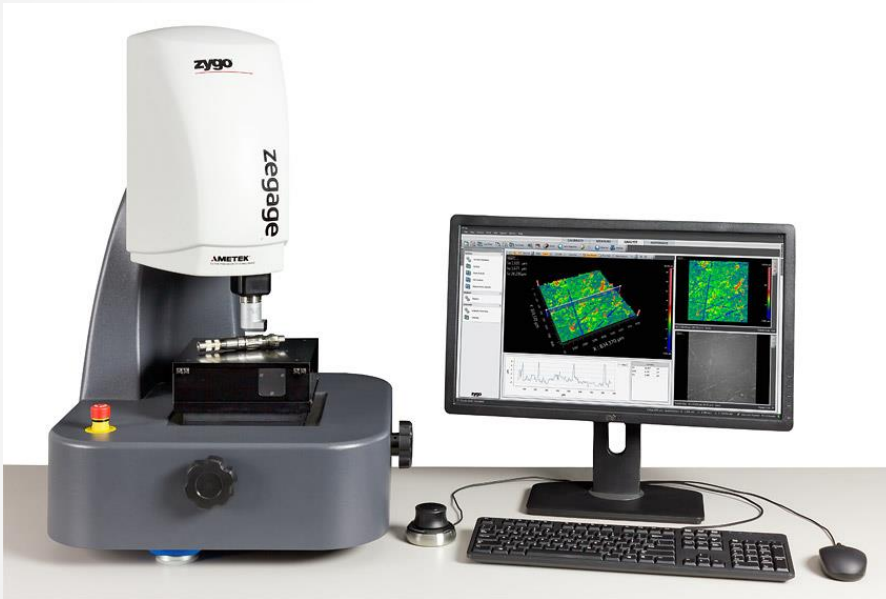


Deneyisel Çalışmalar

Sembol	Parametreler	1. Seviye	2. Seviye	3. Seviye
A	Fe Tozu Tane boyutu (μm)	200	420	710
B	SiC Tozu Tane Boyutu (μm)	58	75	106
C	İşlem Süresi (dak)	30	45	60
D	Devir Sayısı (dev/dak)	1000	1200	1400
E	Karışım Oranı (%)	20	30	40
-	B4C Tane Boyutu (μm)	85	-	-
-	İlerleme Miktarı (mm/dak)	25	-	-
-	İşleme Boşluğu (mm)	0,5	-	-
-	Fe Tozu Miktarı (gr)	10	-	-



Deneyisel Çalışmalar





Deneyysel Sonuçlar

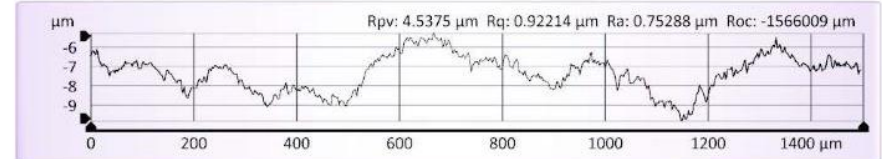
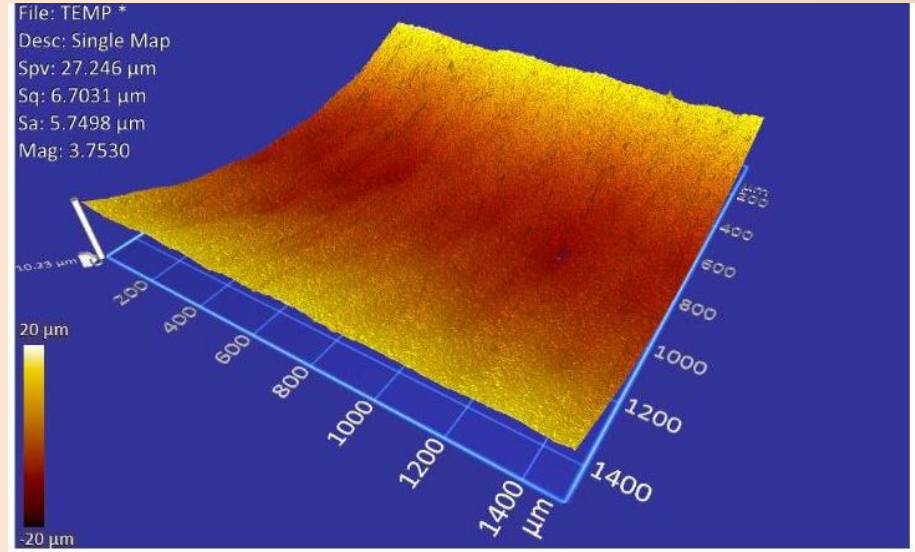
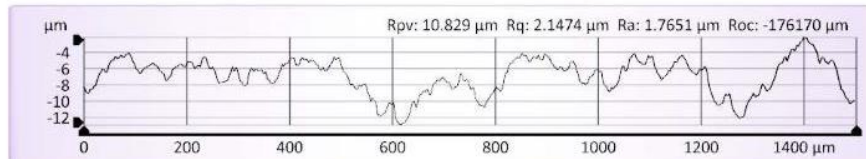
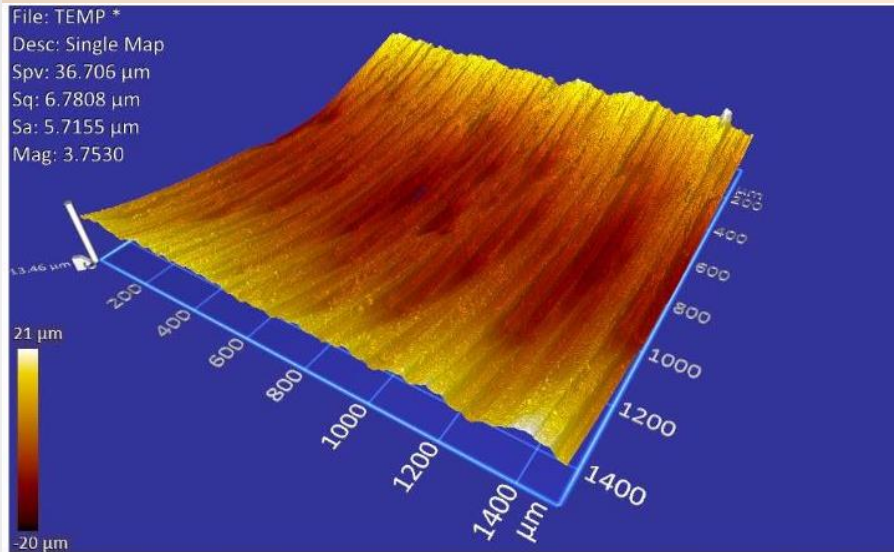
Deney No	R_{ai} (μ M)	R_{as} (μ M)	% İyileşme
1	2,281	1,177	48,388
2	1,500	0,766	48,948
3	1,524	0,720	52,747
4	3,227	2,894	10,323
5	2,018	1,289	36,118
6	3,620	2,060	43,109
7	1,460	0,421	71,180
8	1,987	0,573	71,140
9	2,302	1,364	40,751
10	1,169	0,824	29,483
11	1,725	1,116	35,298
12	2,435	1,042	57,220
13	2,286	1,242	45,686
14	1,979	1,521	23,120
15	1,680	1,200	28,595
16	2,526	1,605	36,444
17	2,859	1,605	43,876
18	1,626	0,808	50,300
19	2,802	2,065	26,296
20	3,163	0,817	74,172
21	2,343	2,139	8,709
22	2,511	1,989	20,791
23	1,841	0,881	52,147
24	3,966	3,124	21,223
25	3,840	1,441	62,466
26	2,648	1,656	37,473
27	2,222	1,734	21,955



Deneysel Sonuçlar



3 NO'LU DENEY



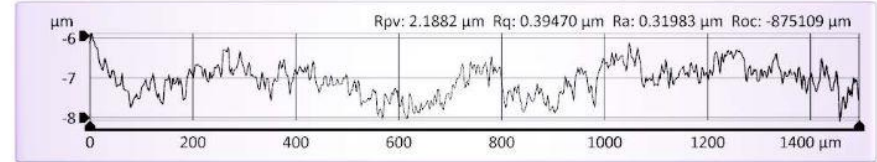
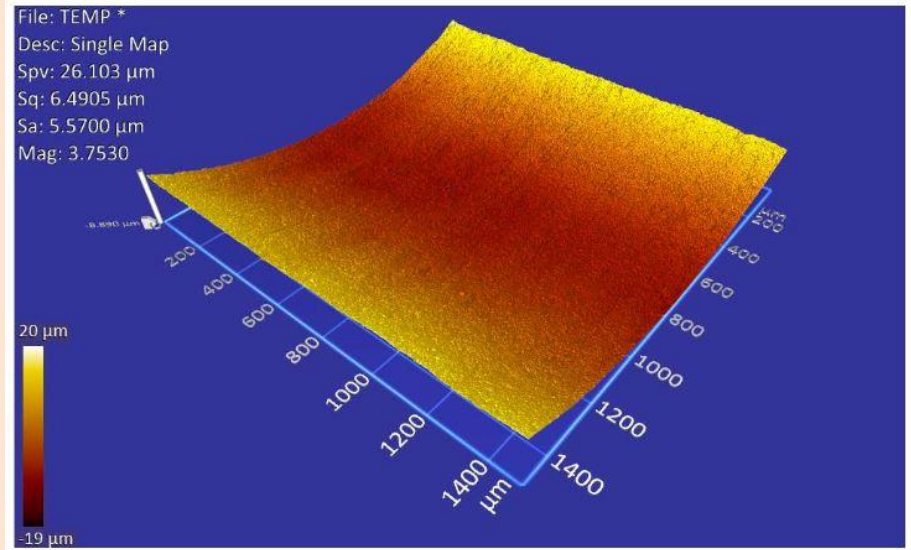
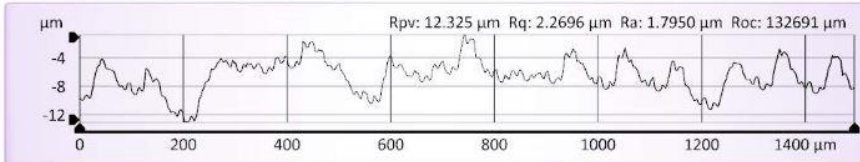
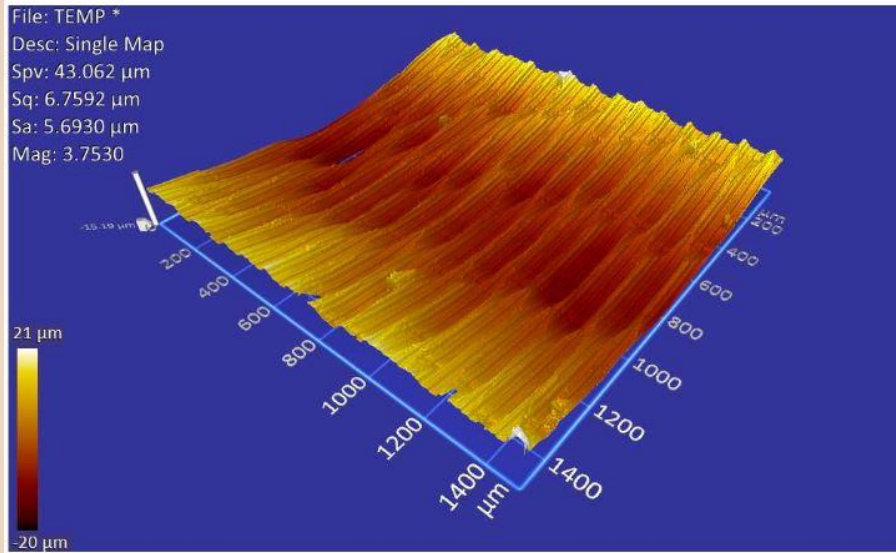
%52,746



Deneyisel Sonuçlar



8 NO'LU DENEY



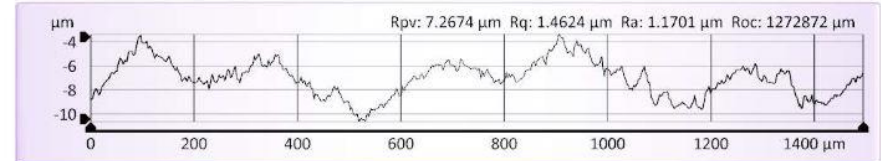
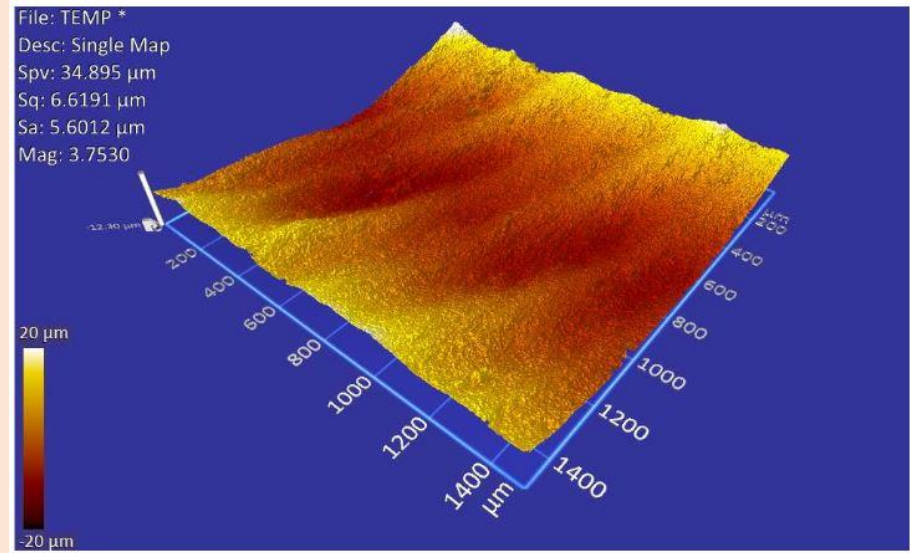
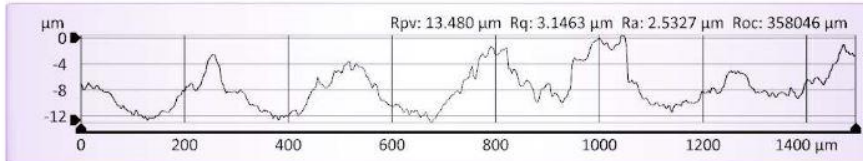
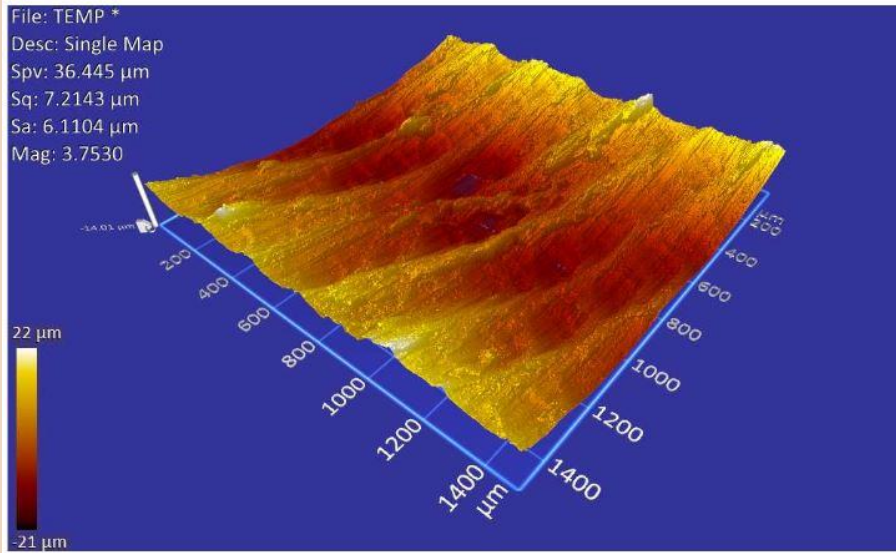
%71,140



Deneysel Sonuçlar



13 NO'LU DENEY



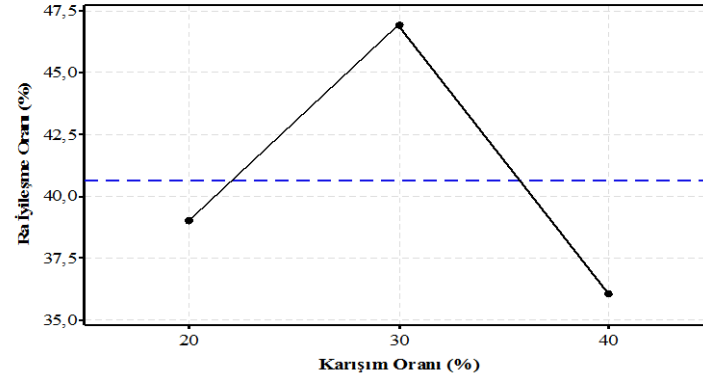
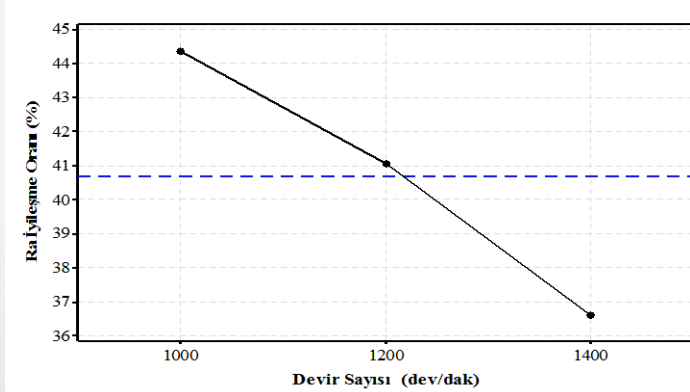
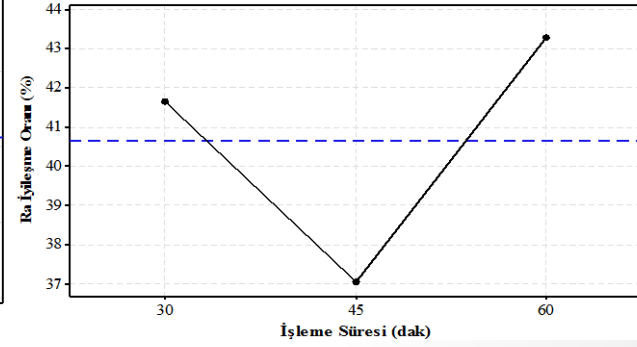
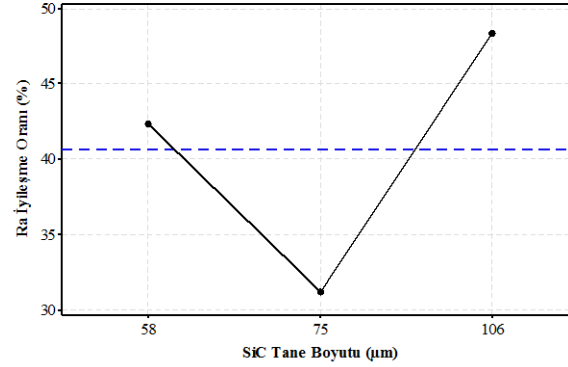
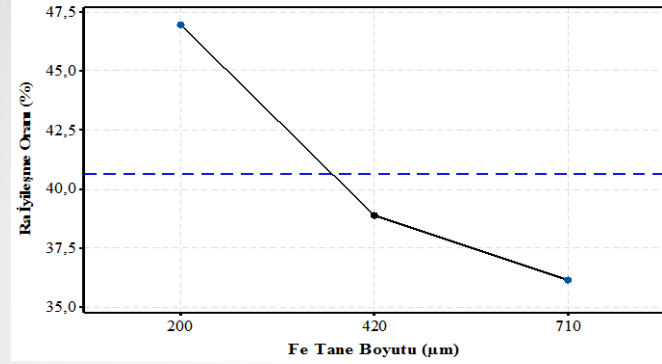
%45,68



Deneysel Sonuçlar



Yüzey Pürüzlülüğündeki İyileşme

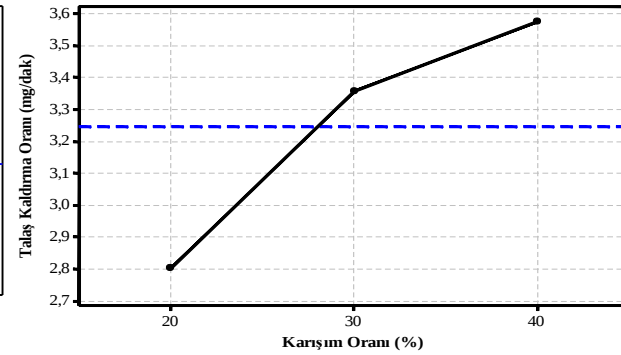
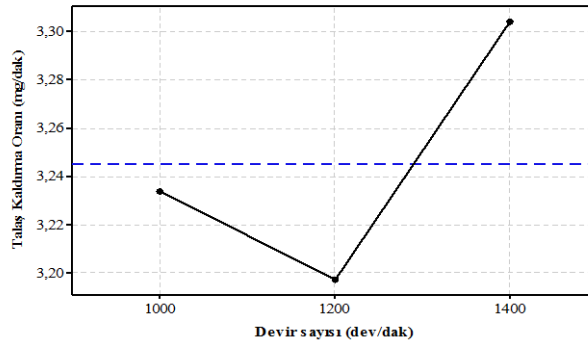
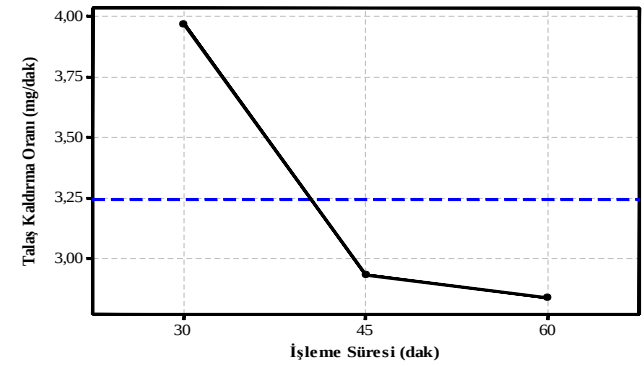
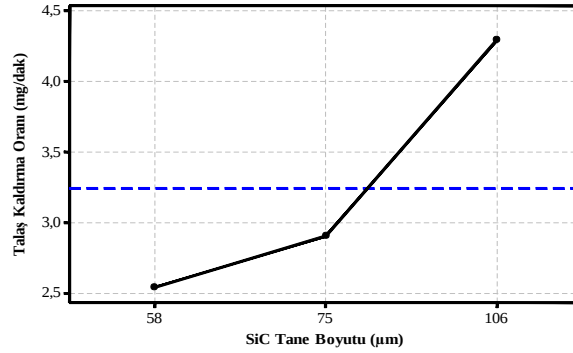
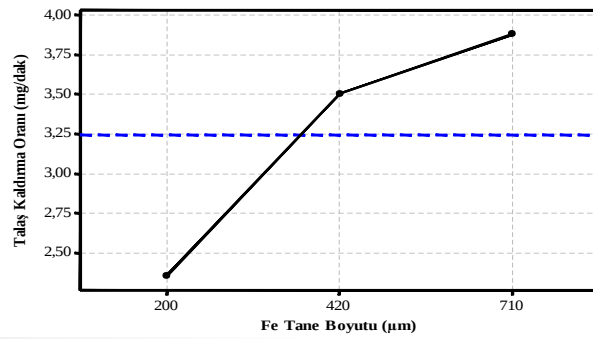




DeneySEL SonuÇlar



Talaş Kaldırma Oranı





Genel Sonuçlar



Sonuç olarak bu çalışmada sanayide geniş kullanım alanı olan AISI 304 L östenitik paslanmaz çelik boruların iç yüzeyleri geleneksel olmayan imalat yöntemlerinden olan Manyetik Aşındırıcılarla İşleme yöntemi ile işlenmiş ve yöntemin en etkin faktör seviyelerinin **A2-B3-C1-D2-E2** olduğu görülmüştür.

Sembol	Parametreler	1. Seviye	2. Seviye	3. Seviye
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B	SiC Tozu Tane Boyutu (μm)	58	75	106
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Teşekkürler

Mahmut ÇELİK